

Upper Mississippi River Nine-Foot Channel Project,
Lock and Dam Number 6
Trempealeau, Wisconsin, vicinity
Trempealeau County, Wisconsin
Winona County, Minnesota

HAER No. WI-48

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WIS,
61-TREM.V,
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Rocky Mountain Regional Office
P.O. Box 25287
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

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Upper Mississippi River Nine-Foot Channel Project,
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Location: 139 miles below Minneapolis, Minnesota, and at mile 714.3 above Cairo, Illinois. Trempealeau vicinity, Wisconsin, in Winona County, Minnesota, and Trempealeau County, Wisconsin

Date of Construction: 1933-1938

Present Owner: United States Government
U. S. Army Corps of Engineers
St. Paul District

Present Use: River navigation/hydrology control

Significance: The Upper Mississippi Lock and Dam Project represents one of the largest and most ambitious of such undertakings. With roots in the Progressive Era, the project was adopted by New Deal proponents to serve the needs of public employment during the Great Depression. Its successful completion turned the upper reaches of one of the world's largest rivers into a intra-continental canal and settled the question of a fully navigable interior river system through the Midwest. Completion of the system helped allay economic inequities in commercial rail and water freight brought about as a result of the opening of the Panama Canal. Although significantly altering the environment of the upper Mississippi, the project also served as an impetus for the upgrading of municipal drinking water and sewage disposal systems, as well as providing new recreational opportunities, thus, in the end, proving generally beneficial to public welfare.

Historian: William Patrick O'Brien
October 1987

PART I. HISTORICAL INFORMATION

A. Physical History:

1. Dates of Erection: 1933-1938
2. Architect/Engineer: U. S. Army Corps of Engineers
3. Original and Subsequent Owners: United States Government
4. Builders, Contractors, Suppliers:

a. General contractors--lock construction:

Spencer White Prentis, Inc., New York, New York

b. Subcontractors--lock construction:

Peppard and Fulton (location unavailable) (test pile driving)
Ferd J. Robers, Burlington, Wisconsin (dredge excavation)
LaCrosse Dredging Company, Minneapolis, Minnesota (dredge excavation)
American Bridge Company (location unavailable) (structural steel/operating machinery)
Sterling Electric Company (location unavailable) (conduits)
Beckman Printing Company (location unavailable) (painting, structural steel)
Drake Marble Company (location unavailable) (tile floor in control house)
Miller and Kleist (location unavailable) (plastering of control house)
E. W. Toye (location unavailable) (plumbing and heating control house)
W. S. Knott Company (location unavailable) (roofing and copper flashing control house)
T. C. Esser (location unavailable) (glazing for control house)
George C. Bolz Dredging Company, St. Louis, Missouri (cofferdam dredging)

c. General contractors--dam construction:

Spencer White Prentis, Inc., New York, New York

Upper Mississippi River Nine-Foot Channel
Project, Lock and Dam Number 6
HAER No. WI-48
(Page 3)

d. Subcontractors--dam construction:

American Bridge Company (location unavailable) (structural steel/operating machinery)
Beckman Painting Company (location unavailable) (painting of steelwork)
George C. Bolz Dredging Company, St. Louis, Missouri (channel dredging, embankments, cofferdam fill removal)
Ferd J. Robers Company, Burlington, Wisconsin (channel dredging, embankment, cofferdam fill removal, topsoil excavation)
Fugins, Miller and Dresser, Winona, Minnesota (derrick stone, riprap, embankment protection)
W. W. Magee Company, St. Paul, Minnesota (channel dredging, embankments, cofferdam removal)
W. S. Knott Company (location unavailable) (roofing Roller gate operating houses)
Pittsburg Plate Glass Company, Minneapolis, Minnesota (glazing Roller gate operating houses)
H. S. Kaliher Company, Alma, Wisconsin (clearing)

5. Original Plans and Construction: U. S. Army Corps of Engineers

6. Alterations and Additions:

<u>Item</u>	<u>Year</u>
Repair/service bridge seats on Roller gate piers	1937
Rock and brush mattress installed to protect against scour under river wall	1938
Repaint Roller and Tainter gates	1949
Construct upper guide wall extension	1950
Emergency replacement of riprap around upper end of upper guidewall	1951
Install scour protection below Roller gates	1951
Install cathodic protection system on auxiliary lock gates	1956
Repaint auxiliary lock Miter gates above water surface	1956
Recondition upper and lower main lock Miter gates	1956
Repair bank erosion	1962
Repair access road	1962
Repair rock riprap	1964
Repaint Roller and Tainter gates	1965
Install deep potable water pump well	1966
Reroof five operating houses	1971
Construct spillway-low water bypass	1972

Upper Mississippi River Nine-Foot Channel
Project, Lock and Dam Number 6
HAER No. WI-48
(Page 4)

Recondition upper and lower main lock Miter gates (repair and paint)	1977
Repair service bridge seats	1978
Connect to city water	1979
Repair scour holes below structures, including blocks on fixed spillway	1980-83
Install new crane on dam	1981
Auxiliary lock rehabilitation	1982-83
Scour repair--dam	1983
Repair piers on dam	1983
Dredge materials relocation	1984
High mast lightings	1984

B. Historical Context

Lock and Dam Number 6 was a group "B" priority project funded as a part of the National Industrial Recovery Act of 1933. The lock and dam were completed in 1935.

Three types of construction were involved, consisting of earth-filled embankments, a concrete and steel movable gate section, and a concrete spillway section.

The movable dam section consisted of five 3-foot submersible Roller gates, 80 by 20 feet, constructed and erected by the American Bridge Company of Gary, Indiana (in conjunction with the S. Morgan Smith Company of York, Pennsylvania; Cutler-Hammer, Inc.; Century Electric, and Foot Brothers), and ten non-submersible Tainter gates, 35 x 15 feet, also constructed and erected by the American Bridge Company. The Tainter gates were the first installations in the St. Paul District to employ independent operating machinery for Tainter gates instead of the hoist car system previously used at Lock and Dams 4 and 5. Both gate systems are supported by reinforced concrete piers.

Lock foundations consist of piles in sand and gravel. Dam foundations are piles in sand and clay. Foundations consist of round timber pilings of elm, maple, hickory, ash, oak, yellow birch, and pine as well as steel sheet piling. Some concern over load was noted in the initial stages of the project and piling diagrams were adjusted. However, the original configuration was later resumed with apparent success. Driving was accomplished by two new skid type timber pile drivers built on the job by the contractor. A new method of keeping the pile driver level was developed by the contractor, consisting of a circular steel slot bolted and welded to the side of the hammer, forming a guide running from the bottom to the top. The slot fit over the adjoining steel pile. Thus, the hammer was kept perpendicular without the use of guide lines. Other technology of note was the pump system, used for the unwatering of various

Upper Mississippi River Nine-Foot Channel
Project, Lock and Dam Number 6
HAER No. WI-48
(Page 5)

dams during construction, consisting of three 12-inch electric centrifugal pumps. Ice proved to be a particular problem. Work was sometimes accomplished using the frozen river as a work base as the ice was 12 to 18 inches thick. Piles were dragged over the ice by teams of draft animals. Various other on-site innovations were accomplished as necessary to facilitate the driving of the remainder of the lock pilings.

Settlement problems in the river wall and upper guidewall were items of concern. However, stabilization was effected without undue complications, although the settlement in the river wall was in the vicinity of three inches.

Lock lift is 6.5 feet. Upper normal pool elevation is 645.5 feet. Depth of upper Miter sill is 17 feet; lower Miter sill is 12.5 feet. The complex was opened to navigation in 1936.

Information regarding the number of injuries during the project is not available.

PART II. TECHNOLOGICAL INFORMATION--LOCK

A. General Statement:

1. Architectural character: standardized Ohio-Mississippi lock design.
2. Condition of fabric: good

B. Description of General Layout and Principal Elements:

1. Overall dimensions: 110 by 600 feet.
2. Foundations: wood and steel sheet pilings in sand, gravel and silt
3. Walls: reinforced monolithic concrete
4. Bulkheads: concrete bulkhead configurations occur at each end of the riverward lockwall
5. Upper and lower guidewalls: monolithic reinforced concrete walls, extending out from the lock chamber at either end to assist in the guiding of barge traffic into the lock.
6. Stage recorder: small concrete housing located at the end of the lock guidewall. Equipment housed for the recording of river stages.

C. Mechanical Equipment:

1. Operating house: controls for lock gates and Tainter valves housed in small buildings on lockwall.
2. Tainter valves: cable drive lock valve of steel construction with electric-motorized assembly.
3. Gates: two Miter gates balanced on stainless steel pintels operated by gear arm system and electric motor assemblies. Bumper lines on interior of lock also of stainless steel. All other associated metal parts are on steel, stainless steel, or steel/nickel alloy.
4. Lighting: various freestanding single or double head lighting standards, ca. 1935.
5. Plumbing: lock is watered by four cable drive Tainter valves serving a system of cast-in-place tunnels that enable the water level to be controlled on the interior of the lock.
6. Winch: motorized assembly to assist towing of barges through lockage.

D. Other Elements:

1. Auxiliary lock: fixed Miter gate without machinery and partial walls located to the riverward side of the lock complex. Equipped with wells for machinery placement. Never completed or put into service.

PART III. TECHNOLOGICAL INFORMATION--MOVABLE DAM

A. General Statement:

1. Architectural character: type 1b Roller gate piers have multi-pane windows, low hip roofs, and engaged buttress detailing and are slightly elephantine in design.
2. Condition of fabric: good

B. Description of Exterior:

1. Overall dimensions: ~ 893 feet in length.
2. Foundations: wood and steel piling in sand, gravel and clay
3. Operating house walls and piers/Tainter gate piers: monolithic reinforced concrete
4. Structural system: monolithic concrete/structural steel

Upper Mississippi River Nine-Foot Channel
Project, Lock and Dam Number 6
HAER No. WI-48
(Page 7)

6. Operating house openings: one doorway and seven 16-pane industrial sash windows for each Roller gate operating house
 - a. Doorways and doors: 5
 - b. Windows: 35
7. Operating house roof:
 - a. Shape, covering: low hip roof in corrugated metal
 - b. Towers: six Roller gate piers and operating house towers; one access pier
8. Access bridges:
 - a. Shape: linear span without arching
 - b. Materials: structural steel

C. Description of General Layout and Principal Elements:

1. Access plans: plan of access consists of a simple exposed concrete stair built into the landward side of the access pier. Each operating house from that point is connected by an access bridge/rail track in a linear series.
2. Stairways: poured concrete/structural steel
3. Flooring: reinforced concrete
4. Wall and ceiling finish: reinforced concrete
5. Hardware: brass

D. Mechanical Equipment:

1. Movable gates--Roller type: five 3-foot submersible units, approximately 20 by 80 feet, operating on tooth track and chain driven hoist machinery with position gauge located on interior of headhouse.
2. Movable gates--Tainter type: 10 non-submersible Tainter gates 15 by 35 feet, with radial gauges and independent chain driven operating machinery.

Upper Mississippi River Nine-Foot Channel
Project, Lock and Dam Number 6
HAER No. WI-48
(Page 8)

3. Bulkhead car/tracks: cars designed to store and access bulkheads. Located in storage yard.
4. Flatcar assembly: car for the transport of gate bulkheads and repair materials.
5. Movable crane: vertical lift crane (replaced ca. 1980) used for the moving of parts and equipment. Operates on track system attached to girder spans. Original "B" type unit. Drawings of replacement unit available from St. Paul District Office.
6. Storage yard: area surrounding the last Roller gate pier on the Wisconsin side. Contains replacement parts for gates, bulkheads on track cars, and related repair items. Also contains track spur for hoist car.
7. Winch: motorized assembly to assist towing of barges through lockage.
8. Boat launch: single-armed launch of metal construction. Installed ca. 1985.
9. Spillway section: 1,000-foot reinforced concrete spillway section southwest of earth dike. See earth dike section.
10. Levee section: various levee configurations typical of most lock and dam sites.

PART IV. TECHNOLOGICAL INFORMATION--ESPLANADE AREA

A. Description of Esplanade--General Layout

1. Design character: standardized park/service area component. The esplanade area was originally designed to accommodate the central control station and various service-related functions. Major site alterations have occurred since that time and are noted in the following items.
2. Historic landscape design: based on standardized designs.

B. Condition of Site and Structures: Altered

1. Central control station--exterior: standardized construction. Hip roof; concrete stucco finish.
 - a. First floor contains central control panel and room, bathroom, main office, and basement stairway access.

Upper Mississippi River Nine-Foot Channel
Project, Lock and Dam Number 6
HAER No. WI-48
(Page 9)

- b. Basement contains storage and equipment rooms. All interior finishes altered from original construction.
- 2. Lockkeeper's/assistant lockkeeper's residences: standardized two-story frame Colonial Revival construction with side porch. Residences are located on County Road K, just outside the city of Trempealeau, Wisconsin.
- 3. Outbuildings: various sheds and service buildings have been erected from time to time as demands required--none have particular significance or contribute to the site. A new garage structure of brick and steel was erected on the old site of the lockkeeper's residence, ca. 1985. The element is standardized.

PART V. SOURCES OF INFORMATION

- A. Original Architectural Drawings: St. Paul District Office, Construction Drawings--9-Foot Channel Project 1927-1984. Passim.
- B. Early Views: Construction Photographs: Lock and Dam 6--Photograph Log Books
- C. Interviews: Personnel, Lock and Dam 6
- D. Bibliography:
 - 1. Primary and unpublished sources: National Archives, Record Group 77; Construction Histories--Lock and Dam 6; see bibliography.
 - 2. Secondary and published sources: see bibliography.
- E. Likely Sources Not Yet Investigated: National Archives, Record Group 77, Suitland, Maryland; St. Louis, Missouri.
- F. Supplemental Material: Aerial Photographs, U. S. Army Corps of Engineers, St. Paul District.